

REMARKS

Applicants and their representative respectfully acknowledge and time and courtesy extended by the Examiners, Mr. Jackson and Mr. Ip, in conducting the Interview of September 25, 2003. The substance of the Interview is reflected in the above amendments and following remarks.

The Amendments

Figure 3 and a description thereof are added to the application in response to the request in the Office Action for drawings showing the channels of different width. This does not constitute new matter. This matter is contained in the Paper D (JNCS article) which was originally an Appendix to the original specification and was then incorporated by reference into the specification; see, e.g., Figure 1 and pages 6-7 of the article.

The claims are amended for clarification purposes and to address the 35 U.S.C. § 112 rejections. Previous independent claims 8 and 12 and claims dependent thereon are rewritten as new claims.

The amendments do not narrow the scope of the claims since they recite aspects which were inherent in the previous claims when read in light of the disclosure. The amendments should not be interpreted as an acquiescence to any objection or rejection made in this application.

To the extent that the amendments avoid the prior art or for other reasons related to patentability, competitors are warned that the amendments are not intended to and do not limit the scope of equivalents which may be asserted on subject matter outside the literal scope of any patented claims but not anticipated or rendered obvious by the prior art or otherwise unpatentable to applicants. Applicants reserve the right to file one or more continuing and/or divisional applications directed to any subject matter disclosed in the application which has been canceled by any of the above amendments.

The Claim to Priority

During the Interview, it was clarified that the objection to applicants' claim to priority was made due to the existence of the Bendett patent (U.S. Patent No. 6,330,388) of record. Apparently, there was a question of why the Bendett patent and the current application have differing inventors even though the Bendett patent and this application claim priority back to the same two US provisional applications. As discussed at the Interview, it is not inconsistent with US law to have a single disclosure provide the basis for sets of claims by different inventors. See, e.g., 37 C.F.R. § 1.45. The invention of the instant claims is supported by the two provisional applications and was made by the named inventors of the current application. It is not inconsistent or improper that other claimed inventions may have been disclosed in the provisional applications which were made by different inventors. Thus, applicants claim to priority is correct and the denial thereof in the Office Action should be withdrawn.

The Objection to the Drawings

The drawings were objected to on the basis that they did not show the feature of the claims of channels having differing widths. A new drawing figure has been added which renders this objection moot. The new drawing is not new matter since it was contained in an article which was submitted with the original filing and incorporated by reference into the application.

The Rejections under 35 U.S.C. § 112, Second Paragraph

The rejections of claims 1-36 under 35 U.S.C. § 112, second paragraph, are respectfully traversed.

It was alleged in the Office Action that the relationship between the elements of the substrate, the channels and the laser species in claims 1-7 was not provided. Claim 1 is amended above to address this rejection. The claim now recites that the glass substrate has

“two or more waveguides defined as channels running longitudinally within the substrate” which “have a distinct refractive index from the substrate.” It also recites that both the substrate and the channels defined therein are doped with a laser species. Thus, it should be evident that the waveguides are a solid state construction within the substrate but distinguished from the substrate by their differing refractive index. For example, the substrate with waveguides can be made from a homogeneous substrate having the laser species homogeneously distributed therein by treating the substrate along longitudinal channels to alter the refractive index, thus, providing longitudinal channels within the substrate which are distinguished by their different refractive index from the substrate. The general concept of waveguides defined as channels within a glass substrate having a different refractive index from the substrate is known in the art. Thus, when read in light of the knowledge in the art – and the specification – the meaning of the claims would be evident to one of ordinary skill in the art.

It was also alleged in the Office Action that claims 8-15, 17, 19-21 and 33-36 omitted the steps of “how to prepare and optical device, heating what or how is the waveguide provided.” These claims have been rewritten as new claims 40-54 and modified to address the rejection. As discussed at the Interview, these new method claims recite separate positive steps for providing the necessary materials and performing the steps to achieve the result. It is believed the new claims adequately define the invention when viewed by one of ordinary skill in the art and, thus, avoid the rejection.

Claims 16 and 17 were also rejected for indefiniteness. Claim 16 was amended and claim 17 replaced to address this rejection. The Office Action states that the claims do not recite positive method steps. However, these are not method claims. The amendments thereto make clear that these are device claims which define further components of the optical device such that the device is in the form of a laser amplifier.

For the above reasons, it is urged that the rejections under 35 U.S.C. § 112, second paragraph, be withdrawn.

The Rejection under 35 U.S.C. § 102

The rejection of claims 12 and 13 under 35 U.S.C. § 102, as being anticipated by McFarland (U.S. Patent No. 5,541,039) is respectfully traversed.

Claims 12 and 13 were replaced by new claims (see claims 50-54). New claim 50 combines the substance of previous claims 12 and 13 and also recites that the substrate is a glass substrate.

Initially, it is pointed out that McFarland is not directed to any method involving waveguides based on glass substrates. McFarland is directed to creating waveguides in organic materials, i.e., polymers, by application of actinic radiation; see, e.g., col. 3, lines 30-35. Thus, McFarland is distinguished from the instant claims at least on this basis.

Further, McFarland (and the prior art discussed in its background) fails to disclose or suggest a method for modifying the wavelength of pre-existing waveguides. The invention of claim 50 recites modifying or tuning the wavelengths of a glass substrate doped with a laser species which already has one or more waveguides defined as channels therein. McFarland discloses a method of creating waveguides in a substrate, not modifying an existing substrate having waveguides. For this additional reason, McFarland fails to teach the claimed method.

Additionally, McFarland fails to disclose a step of heating the substrate containing one or more waveguides to modify the wavelength of the one or more waveguides in a "finely tuned way whereby the heating expands the glass to increase the wavelength but the extent of increase in wavelength is lessened by the heating also decreasing the refractive index of the glass forming the one or more waveguides." See claim 50. While one of ordinary skill in the art might have expected that the heating would expand the glass to increase the wavelength, the combined effect of the decrease in refractive index of the glass in the waveguide such that the overall wavelength increase is of a finer extent would not have been expected in the art.

For at least these reasons, McFarland does not meet all elements of the claims and does not anticipate the claims. The rejection under 35 U.S.C. § 102 should, therefore, be withdrawn.

The Rejection under 35 U.S.C. § 103 over McFarland in view of Myers

The rejection of claims 14, 15, 20 and 21 under 35 U.S.C. § 103, as being obvious over McFarland in view of Myers (U.S. Patent No. 5,164,343) is respectfully traversed.

The discussion of McFarland above is incorporated herein by reference. As discussed McFarland fails to teach a method of treating a glass substrate containing waveguides. Also, it fails to teach a method of modifying such a substrate which already contains waveguides; instead, McFarland relates to creating waveguides in a polymer substrate. There are no teachings in McFarland to suggest applying its method to glass substrate materials. To the contrary, a main thrust of the McFarland invention is the use of polymer materials. Further, there is no suggestion from McFarland of any method for modifying the wavelength of waveguides already existing within a substrate. Myers was cited for its teachings unrelated to either of these distinguishing aspects. Thus, nothing in Myers suggests modifying McFarland to suggest the instant claimed invention. Further, Myers is directed to phosphate glass compositions and there would be no motivation to one of ordinary skill in the art to apply the teachings of Myers to the McFarland invention which is directed exclusively to polymer materials. Regardless, Myers teaches nothing regarding waveguides so, obviously, teaches nothing about modifying the wavelength of waveguides in a substrate containing waveguides.

Accordingly, the rejection under 35 U.S.C. § 103 should be withdrawn.

The Rejections under 35 U.S.C. § 103 over McCallion alone or in view of Myers

The rejections of claim 1 and of claims 2-5, 8-11 and 16-19 under 35 U.S.C. § 103, as being obvious over McCallion (U.S. Patent No. 6,270,604) alone or in view of Myers (U.S. Patent No. 5,164,343) are respectfully traversed.

McCallion does not disclose waveguides from channels in a substrate wherein the channels have differing widths to provide differing effective refractive indices. The Office Action continues to state that the reference provides such teaching and refers to col. 5, line 47, to col. 6, line 13, and col. 34, line 65, to col. 36, line 43. But the Office Action contradicts itself by also correctly stating that “McCallion et al. fail to disclose two or more waveguides.” McCallion obviously could not disclose a substrate with waveguide channels of differing width if it doesn’t even disclose a substrate with two or more waveguide channels. McCallion at cols. 5-6 (McCallion has no cols. 34-36, thus, this citation in the Office Action is clearly in error) discusses using different thicknesses of optical adhesives as a cladding material and different layer thicknesses of its materials. But these variations only are disclosed in the context of providing a single waveguide within a substrate. A review of Figures 2A - 2H of McCallion makes clear that the layering slicing, turning and additional layering steps of McCallion result in a device which contains a single waveguide within the substrate, i.e., the sole waveguide is the singular element 12 in Fig. 2H. While the dimensions of this singular waveguide can be varied, there is no suggestion of a single optical device which has multiple channel waveguides within a single substrate. Obviously, therefore, there is no suggestion of a single optical device with two or more channel waveguides wherein at least two of the channel waveguides have differing widths.

Nor is there any suggestion in McCallion of a reason why one of ordinary skill in the art would want to provide two or more channel waveguides wherein at least two of the channel waveguides have differing widths. Further, McCallion provides no teachings as to how it would be possible to achieve a substrate with multiple waveguide channels using the method of McCallion. Thus, McCallion provides no motivation to one of ordinary skill in the

art to provide a substrate with multiple waveguide channels, let alone at least two channels that differ in width. In the absence of any motivation to arrive at applicants' invention, the rejection under 35 U.S.C. § 103 is not supported. See, e.g., *Grain Processing v. American Maize*, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988); and *Orthopedic Equipment Co., Inc. v. United States*, 217 USPQ 193, 199 (Fed. Cir. 1983).

Regarding new claims 40-49 (previous independent claim 8), McCallion teaches nothing at all regarding a method of fusing active and passive doped substrate elements to provide a unitary optical device with active doped and passive doped regions. The Office Action addresses these claims at page 7, paragraph 3. The paragraph addresses the claims as if they were dependent on claim 1, but they are not. Claim 8 was an independent claim and new claim 40 is an independent claim. They do not recite methods for forming the device of claim 1. These claims are method claims drawn to a method of making an optical device with active doped and passive doped regions. The cited art has no suggestion at all of such a method.

Myers has been discussed above and that discussion is incorporated herein by reference. Myers is cited only for its teachings as to embodiments of certain dependent claims. It teaches nothing regarding waveguide channels of differing width or of fusing active and passive elements and, thus, fails to cure the above discussed deficiencies of McCallion to teach or suggest the claimed invention.

For all of the above reasons, it is urged that McCallion, alone or in view of Myers, fails to render the claimed invention obvious to one of ordinary skill in the art. Thus, the two rejections under 35 U.S.C. § 103 based on McCallion should be withdrawn.

It is submitted that the claims are in condition for allowance. However, the Examiner is kindly invited to contact the undersigned to discuss any unresolved matters.

In view of the above, favorable reconsideration is courteously requested. If there are any remaining issues which can be expedited by a telephone conference, the examiner is courteously invited to telephone counsel at the number indicated below.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,



John A. Sopp, Reg. No. 33,103
Attorney for Applicants

MILLEN, WHITE, ZELANO &
BRANIGAN, P.C.
Arlington Courthouse Plaza 1, Suite 1400
2200 Clarendon Boulevard
Arlington, Virginia 22201
Telephone: (703) 243-6333
Facsimile: (703) 243-6410

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